

## CLAIMS

- 1 1. A method for identifying co-evolving regions in the memory of a target  
2 application, comprising:  
3 receiving information identifying a set of data structures that are evolving; and  
4 classifying the constituents of the data structures based on their likelihood to  
5 evolve in a single coherent manner.
- 1 2. The method of claim 1 wherein classifying the constituents of the data  
2 structures based on their likelihood to evolve in a single coherent manner further  
3 comprises determining coherency by similarity of key structural features and data type  
4 of the constituents.
- 1 3. The method of claim 1 further comprising a qualitative characterization of the  
2 co-evolving regions based on their observed evolution.
- 1 4. The method of claim 1 further comprising a quantitative characterization of the  
2 co-evolving regions based on their observed evolution.
- 1 5. The method of claim 3 wherein the qualitative characterization comprises  
2 characterizing the regions as exhibiting one of the following growth patterns:  
3 monotonic growth, monotonic shrinkage, bounded-size and fixed constituency, and  
4 bounded-size and changing constituency.

- 1 6. The method of claim 4 wherein the quantitative characterization comprises  
2 identifying a subset of the region that indicates region updates; and  
3 reporting measures in terms of these subsets over time.
- 1 7. The method of claim 1 wherein the step of receiving information comprises  
2 receiving information identifying at least one leak root candidate.
- 1 8. The method of claim 7 wherein data structures are identified by choosing those  
2 leak root candidates whose rank lies above a desired threshold.
- 1 9. The method of claim 2 wherein for every identified data structure the method  
2 for classifying further comprises steps of:  
3 receiving a plurality of samples of the constituency of that data structure, and  
4 computing the region key for each constituent, and  
5 classifying constituents based on region key equivalence.
- 1 10. A computer readable medium for identifying co-evolving regions in the  
2 memory of a target application, comprising instructions for:  
3 receiving information identifying a set of data structures that are evolving; and  
4 classifying the constituents of the data structures based on their likelihood to  
5 evolve in a single coherent manner.

- 1    11.    An information processing system comprising:  
2            a processor comprising logic for performing instructions of:  
3                    identifying a set of data structures that are evolving; and  
4                    classifying the constituents of the data structures based on their  
5            likelihood to evolve in a single coherent manner; and  
6            a memory for storing the instructions.